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Abstract

MARITIME NUCLEAR PROPULSION EXPERIENCE

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The N. S. SAVANNAH provides a means for the United States to explore the technical, economic, social, and political aspects pertinent to the development of a viable nuclear powered merchant marine. All advantages to be realized from this development are conditional upon complete acceptance of the ship in the ports of the world. This places extreme emphasis on the efficiency and integrity of the reactor containment systems.

A merchant ship must enter crowded ports to pick up and discharge its cargo. Therefore, unlike land-based power reactors, requirements with respect to containment efficiency are greatly amplified. Entrance of the N. S. SAVANNAH into densely populated ports is now made feasible by the containment system, control of fission product inventory, and assurance of ship mobility in the unlikely event of an accident.

Since SAVANNAH's initial startup, a continuing developmental program has been carried on to reduce the early requirement for mobility as part of siting criteria by improving reactor containment. Containment penetrations have been improved, testing techniques have been made more positive and rapid, and pressure suppression systems are being explored.

In addition, the secondary containment exhaust air cleaning system has been augmented with an entrained water separator and better efficiency testing apparatus. The development of more compact, less costly shipboard containment techniques with even higher efficiency is the goal of this work to eliminate mobility as a siting criterion. The development work in these areas and the results obtained to date are discussed.

Other problems associated with the establishment of rules, regulations, and procedures to allow routine reactor operation in the crowded ports of the world are discussed. Reactions by the general populace and authorities are presented.

Before each initial port visitation, the particular foreign government, local port authorities and officials, the U. S. Coast Guard, and the U. S. Atomic Energy Commission review and approve the written analysis and plan prepared for that port. Each visit of the N. S. SAVANNAH is also preceded by a public events team which plans, in close association with local participants, the detailed visitation procedures. Just prior to port entry, this team organizes and supervises all appropriate port services. The development and utilization of these plans in actual port operations are discussed.

Future SAVANNAH plans and the potential impact on future merchant ships are discussed.